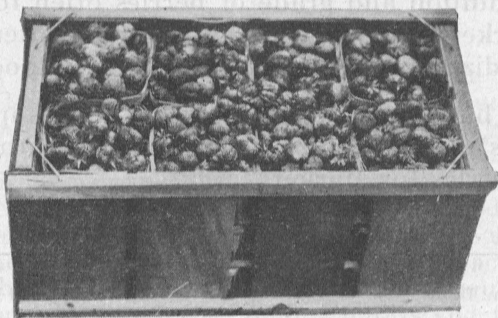


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U. S. DEPARTMENT OF  
AGRICULTURE  
FARMERS' BULLETIN No. 1560

PREPARING  
STRAWBERRIES  
FOR  
MARKET



U. S. DEPARTMENT OF AGRICULTURE  
FARMERS' BULLETIN 979

**S**TANDARD STRAWBERRY GRADES are desirable as a guide and basis for the use of growers in preparing their crop for the market, of buyers in the purchase of fruit, and of inspectors at the point of shipment or destination.

Growers should aim to produce berries of such uniformly high quality that no hand grading is necessary, as any extra handling adds to the liability to decay. In many instances, however, hand grading is necessary and profitable. The logical place to grade berries is in the field. Whether or not the strawberries have been hand or field graded, the filled boxes should be classified as to grade before they are placed in crates for shipment.

This bulletin describes efficient methods of preparing strawberries for market. The unsatisfactory condition and grade of berries often found on the markets indicates a need for more attention to standardization and better handling methods.

This bulletin is a revision of and supersedes Farmers' Bulletin 979, entitled "Preparation of Strawberries for Market."

Washington, D. C.

Issued March, 1928

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# PREPARING STRAWBERRIES FOR MARKET

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## IMPORTANCE OF GOOD HANDLING

**S**UCCESS in marketing strawberries is dependent to a large extent upon the proper picking, grading, and packing of the fruit.

Strawberries of a dependable grade and pack inspire in the trade a confidence which is reflected in a greater demand and higher prices for the product. The best of marketing facilities, however, can not overcome the handicap of indifferent handling methods, and good prices ordinarily are not obtained for an inferior product. Dissatisfaction and lack of stability in the markets are caused, in a large degree, by carelessness in the preparing of fruit for market. Improvements in handling methods should come about through the systematic efforts of growers with the earnest cooperation of dealers, and through cooperative marketing organizations.

## THE LABOR PROBLEM

Unless they are engaged well in advance of the harvest season, the grower often is unable to secure a sufficient number of pickers to harvest the berries as fast as they ripen. If graded out, the overripe berries are a total loss; if packed, they reduce greatly the value of the firm berries with which they are marketed.

Men, women, and children from the neighborhood are preferable to transient labor. Usually they can be depended upon to remain throughout the harvest season. If there is a large acreage of berries in the neighborhood, however, outside help frequently must be obtained. Some families have camping outfits and travel from one strawberry district to another as the season advances. Many growers contract for labor from outside the immediate neighborhood and furnish free camping facilities. (Fig. 1.) Many strawberries are picked by persons who begin work when the harvest begins, in the Southern States, and follow the berry season north. These laborers usually are efficient but are not always dependable. Many pickers stop work after the height of the season or as soon as the best of the picking is over. In some strawberry districts a premium, in addition to the regular picking price per box, is offered to the pickers who stay until the end of the harvesting season. This plan is illustrated on one of the tickets shown in Figure 2.

## PICKING

Proper supervision of the picking force is especially important with the strawberry crop on account of the class of labor ordinarily used and the ease with which the berries are damaged. The quality of the berries delivered to the packing shed depends, to a large extent, upon the efficiency of the person in charge of the pickers. Usually a "row boss" or foreman is placed in charge of a group of pickers. He sees that rows are assigned to the pickers, that no ripe berries are left unpicked, that the number of green or otherwise defective berries placed in the box is held to the minimum, and that the pickers do not trample on the rows unnecessarily while picking or when walking to and from the packing shed. The number of pickers a foreman can supervise to advantage ranges from 25 to 40. The grower can advantageously spend most of his time in the general supervision of the picking, grading, and packing operations.

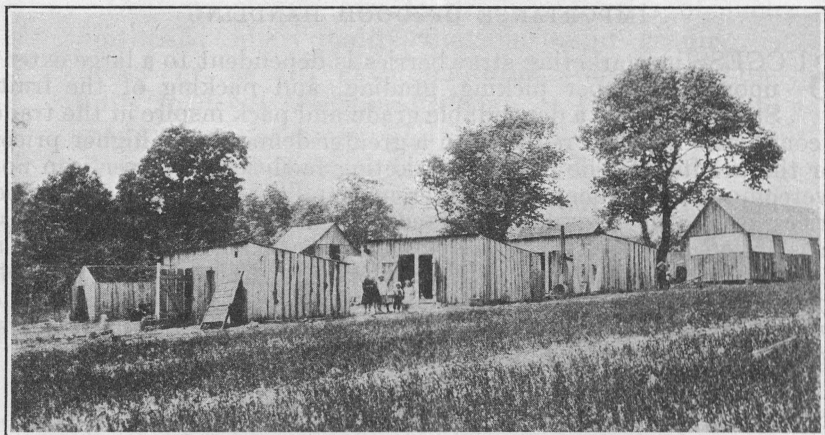


FIG. 1.—Camp for strawberry pickers, constructed by the grower

When berries are ripening rapidly the fields should be picked each day, and, if possible, the picking and packing should be done during the cooler parts of the day. The proper stage of ripeness for picking strawberries depends upon the variety and the distance to be shipped. Some varieties are naturally firm and can safely be allowed to attain a full red color; others soften quickly upon ripening and must be picked before they are full red color. Varieties which soften quickly are not suitable for long-distance shipment. Obviously, berries for local markets should be allowed to ripen more fully than those intended for distant markets.

Most of the shipping associations in Southern States, from which berries must be transported long distances, have picking instructions that call for berries from about three-fourths colored to a full red color. It is not possible to have all berries picked at exactly one stage of ripeness. When the pickers are instructed to pick with three-fourths full red color, berries may be found in their trays which vary from one-half colored to full red color, depending largely upon the experience and efficiency of the pickers and the closeness of the field supervision. Proper supervision of the pickers reduces this variation to a minimum. Strawberries must be picked when firm



enough to be transported to market and distributed to consumers successfully, but all fruits sell, to a large extent, on their appearance, and, other conditions being equal, well-colored berries sell faster and return larger profits than does poorly colored fruit. Growers and shippers will find it profitable to trace enough of their shipments

6	.09	6	1.71	We will pay you 6 cts. per gallon straight, weekly, but if you pick whenever needed, including Monday and Saturday, throughout season, we will pay you 1 c. per gallon premium at the end of season, making 7 cts. per gallon.	TO.....	Picker No. ....	M	T	W	T	F	S	Card No. ....	3.33	6
6	.18	6	1.80											3.42	6
6	.27	6	1.89											3.51	6
6	.36	6	1.98											3.60	6
6	.45	6	2.07											3.69	6
6	.54	6	2.16											3.78	6
6	.63	6	2.25											3.87	6
6	.72	6	2.34											3.96	6
6	.81	6	2.43											4.05	6
6	.90	6	2.52											4.14	6
6	.99	6	2.61											4.23	6
6	1.08	6	2.70											4.32	6
6	1.17	6	2.79											4.41	6
6	1.26	6	2.88											4.50	6
6	1.35	6	2.97											4.59	6
6	1.44	6	3.06											4.68	6
6	1.53	6	3.15	4.77	6										
6	1.62	6	3.24	4.86	6										

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Berry Ticket  
QUARTS

Berry Ticket  
QUARTS

Berry Ticket  
1 Crate

FIG. 2.—Two common forms used as pickers' tickets

to market to determine whether they are being delivered to dealers in the best possible condition. In this way losses may be avoided and the grower may get suggestions which enable him to make a better appeal to the consumer's appetite, which result in an increase in the consumption of strawberries.

Pickers should be taught the proper method of picking. Large quantities of desirable berries may be ruined by carelessness, indif-

ference, or inexperience in picking. The best picking is done by the use of the thumb and forefinger (fig. 3), each berry being pinched off, with a stem about three-eighths to one-half inch long, and placed carefully (not thrown, tossed, or dropped) into the box. To gain speed, there is always a tendency to pull or snatch the berries from the plant and toss them into the boxes. Some pickers crush, bruise, or squeeze much fruit by holding too many berries in the hand at one



FIG. 3.—Proper method (left) and two improper methods (right) of picking the strawberries

time; others pile up berries on full trays which must later be taken off and placed in other boxes. Such practices result in bruising the berries and often mean the loss of many of the hulls or caps. Damaged berries and berries without hulls do not carry well to the market, and should not be placed in the boxes. Unless each row is picked clean of all berries that are ready, the next picking will contain overripe fruit.

Two methods of giving pickers credit for their work are in common use, either of which seems satisfactory. (Fig. 2.) Under one method small tickets are issued, bearing numbers conforming to the number of filled boxes delivered to the packing shed. The "meal ticket" method also is common. Tickets or tags are issued bearing printed figures either in terms of money or in numbers of boxes, or both.

These tickets are punched as the berries are delivered. Some growers who employ this method find it necessary to use an adjustable punch which can be changed from day to day to prevent misrepresentation. With either method the picker may cash his tickets at stated periods. In many sections the tickets are accepted by local storekeepers as cash in payment for purchases. By a third method, which seems practicable where many pickers are employed, a bookkeeper is stationed at the entrance of the packing shed, who records, in plain view of the picker, the number of filled boxes which he delivers.

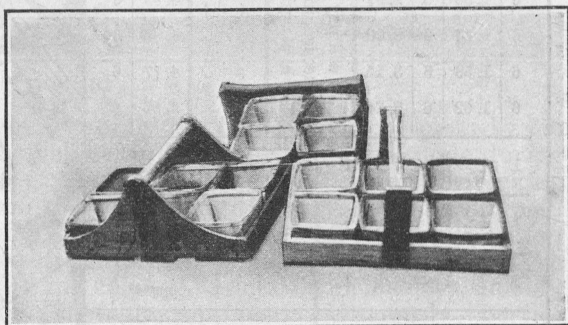


FIG. 4.—Convenient and popular-sized picking tray

The trays used for carrying the berry boxes into the field, whether made at home or in a factory, should be light in weight, substantial, and so built that the boxes fit in them snugly. They are made in different sizes holding from 4 to 12 boxes. The most popular sizes are those which hold 4 or 6 boxes. (Fig. 4.) The large trays are

unwieldy in the hands of the picker, and unless provided with legs, can not be placed on the ground in the field without danger of crushing unpicked berries. (Fig. 5.) So much time is used in filling the large trays that there is danger of the fruit becoming overheated by exposure to the sun before it is delivered to the packing shed. One tray at a time is enough for each picker to carry to the field, to be delivered to the packing shed as soon as it is filled. In some sections

the growers allow the pickers to set each box on the ground as filled. This is a bad practice if many boxes are filled and exposed to the sun before they are delivered to the packing shed. Some growers furnish laborers for collecting the boxes from the pickers in the field as fast as they are filled, in order to avoid the

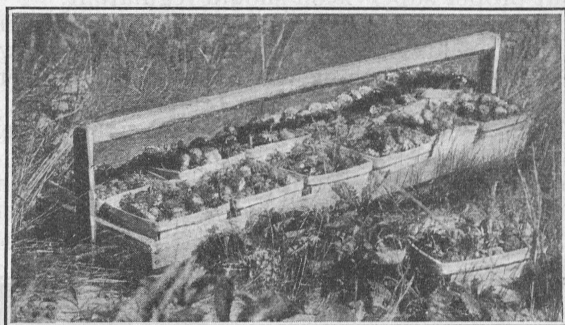


FIG. 5.—A 12-quart tray. This type of tray is too large for convenience, its use results in the berries standing too long in the sun. It is most useful for carrying berries from the field to the packing shed

necessity of so much walking back and forth by the pickers. The larger trays are used to advantage under this method.

Picked berries are injured by exposure to the sun, rain, or dust, whether in the field, at the packing shed, or while being hauled to the railroad.

### GRADING

Strawberries should be graded, either by hand sorting the individual berries or by classifying the filled boxes. Which of these two methods will prove most satisfactory will depend upon local conditions. In every shipping section growers are found who, by exercising care, grow berries of such uniformly high quality that no hand grading is necessary. This should be the ideal of all growers, as an extra handling adds to the liability to decay.<sup>1</sup> In many instances, however, hand grading is necessary and profitable.

#### HAND GRADING

Hand sorting or grading consists of separating the undesirable or cull berries from the merchantable fruit. It must be done in the field or at the packing shed. Logically the fruit should be graded by the picker in the field. The amount and the method of hand grading which will secure maximum results will not be the same for all conditions and in all shipping sections, but in most instances it will be found profitable to eliminate the overripe, green, deformed, very small, or otherwise undesirable berries from field-run stock. All leaves, sticks, and other trash are removed at the same time.

Field grading by the pickers causes the least amount of handling, but it is successful only when it is strictly supervised. Pickers, as a

<sup>1</sup> ROSE, D. H. DISEASES OF STRAWBERRIES ON THE MARKET. U. S. Dept. Agr. Circ. 402, 8 p., illus. 1926.  
STEVENS, N. E. STRAWBERRY DISEASES. U. S. Dept. Agr. Farmers' Bul. 1458, 10 p., illus. 1925.  
— and WILCOX, R. B. RHIZOPUS ROT OF STRAWBERRIES IN TRANSIT. U. S. Dept. Agr. Bul. 531, 22 p., illus. 1917.

rule, do not like to sort the berries while picking. Yet many strawberry growers are successful in having the grading done in the field as the berries are picked by paying pickers for all that are picked but requiring that the cull stock and the merchantable fruit be placed in separate boxes. The separation of the large and small stock might be encouraged by paying more per box for picking the small berries than for the large ones. This practice could be abused by the pickers but proper supervision should regulate it.

In most of the strawberry sections no grading is attempted except at the packing shed. The method and care with which strawberries are graded at packing sheds vary. A large percentage of the growers do nothing further, even at the packing shed, than to place in crates the boxes of berries as delivered by the picker. A few growers cull out only the green, overripe, decayed, or otherwise undesirable berries found on the tops of the boxes. Others empty the berries from the box in which they are picked into another box and during the process sort out all of the cull berries that are noticed.



FIG. 6.—“Pan grading” as practiced to some extent in southwestern Missouri

A thorough method of grading or sorting is practiced to some extent in the Ozark berry section, where the principal variety grown is the Aroma. Each box of field-run berries is emptied into a specially constructed tin grading pan (fig. 6), and the undesirable berries are sorted out as the fruit is poured from the pan back into a box. This “pan grading,” when done carefully, eliminates all berries considered by the grader to be undesirable.

The success and feasibility of pan grading depends upon the following factors: (1) The variety of the berries; (2) the amount and quality of labor available to the grower; and (3) an adequate price for the graded fruit. Strawberries of the Aroma variety will withstand considerable rehandling and have been pan-graded through several seasons in southwestern Missouri with excellent results. Fruit of tender varieties, or a lot of fruit which, as a whole, is slightly overripe, is damaged materially by rehandling, and the poor condition of the graded berries which have become soft by the time they reach the market more than offsets any extra market value added by grading out the culls at the packing shed.



Successful pan grading depends also upon a sufficient force of intelligent laborers, who work with care and speed. The total expense of this grading includes the cost of picking the culls, the labor cost of grading them out at the packing shed, and the loss in total bulk which results from discarding the culls. The pan-graded product must be sold for a proportionately higher price than the ungraded product, and the grower must receive this adequate increase in price before he will be repaid for his efforts.

#### CLASSIFYING THE FILLED BOXES

Whether or not the berries are hand graded, they should be classified at the packing shed. This classification should consist of separating the filled boxes according to quality, grade, and size, and placing those of similar value into crates by themselves. It is often true that the boxes of berries from certain parts of the field, or those picked by careless laborers, are of such low quality that if they are mixed with boxes containing berries of high quality they injure materially the value of the entire package of fruit. Some boxes may contain berries of such low quality that they will have to be discarded as culls. Such classification should be based on well-defined standards, and the crates should be marked accordingly, for the benefit of the inspector at the loading shed, the dealers, and the consumers.

#### STANDARDIZED GRADES

Well-defined standardized grades, properly and consistently used, promote honesty and fair dealing and discourage the careless and unscrupulous packer. They enable the conscientious grower and shipper to realize a premium for care, honesty, and good judgment. They provide a common language with which to describe quality, maturity, size, and all factors that determine the value of a given shipment. They serve as a convenient, fair, and equitable basis for sales, for quotations to buyers, for inspection at shipping points and in receiving markets, for adjustments of claims, for cooperative pooling, for financing, and for the reporting and intelligent comparison of market prices.

The United States Department of Agriculture has formulated grades for strawberries which each year are coming into more extensive use.<sup>2</sup> The terminology used in these grades is the same no matter in what market and what producing section of the United States they may be used. U. S. No. 1 strawberries means the same no matter where the term may be used. Consistent adherence to high standards builds good will and creates confidence.

In the determination of grades for strawberries the factors given the greatest consideration are size and quality.

The size of strawberries varies with the variety and the section in which they are produced. Usually the trade wishes a berry not less than three-fourths inch in diameter. However, as size normally is considered as much as is any other factor in connection with grades, a minimum size should be specified unless it is found that the straw-

<sup>2</sup>These Federal grades for strawberries may be subject to slight revision from time to time, and therefore are not given here. Copies may be procured without charge from the United States Department of Agriculture, Washington, D. C.

berries meet the specified minimum size requirements of the United States standard grade. It is not practicable to separate all the different sizes of strawberries, as boxed apples or oranges are sized, yet careful attention is needed in order to prevent the packing of boxes that are filled with small berries in the same shipping crates with those of desirable-size berries.

One of the first requisites for a good grade of strawberries is that they shall be firm enough to carry to market in good condition. The carrying quality, which affects the market value directly, is dependent upon the firmness or degree of maturity of the berries. Overripe berries will not carry well. They usually become soft, or perhaps decayed, moldy, or "leaking" by the time they reach the market. They mar the appearance of the pack and decrease the market value. Immature and green berries also seriously affect the general quality and should be kept out of the boxes.

To obtain reasonably uniform maturity, and a proper degree of maturity, pickings should be made frequently, the frequency depending upon the rapidity with which the berries ripen. Care must also be taken to see that all matured berries are picked. If left on the plants they will be too soft for shipping and will entail a loss when picked.

Berries which are water-soaked or have the least indication of decay should not be shipped. Those which have been bruised, crushed, cut, or otherwise damaged should be discarded. Care should be exercised to keep out of the pack, as far as possible, berries that are sandy or dirty. Such fruit is of poor quality and is hard to sell. Furthermore, berries that have lost the hulls should not be placed in the package.

Varieties have characteristic appearances, sizes, and carrying qualities and berries of only one variety should be placed in a box or crate. There is little occasion for a mixture of varieties, as they usually are grown in separate rows. Picking supervision is all that is needed.

The multiplicity of grade names such as "Fancy," "Choice," "A," "B," "Firsts," and "Seconds" creates confusion. It is the purpose of the United States Department of Agriculture to standardize the names of the grades as well as the grades themselves.

Every shipping section needs uniform grades, and it is believed that the grades promulgated by the department will supply these needs. Strawberry-shipping associations need the grades as a guide for their growers in preparing the crop for market and as a basis of inspection. The need is even greater where the growers are unorganized. Buyers, both at the shipping point and in the market, should have a definite basis upon which to make their purchases. The value of standard grades depends upon their specifications and the extent to which the growers and shippers adhere to them.

#### PACKING

Strawberry boxes, when properly filled, are neither slack nor so full that the berries are likely to be crushed; they are full enough to look attractive and they are still well filled after being transported to the market and sold and delivered to the consumer. At the same time there is danger of filling the boxes so full that the cover will

crush many berries. Usually growers fill their boxes well, but there are still a few who appear to think they can save berries by slack packing, and thus increase their own profits. The grower who does this loses eventually. Slack-packed berries are as difficult to sell as those which are beginning to decay. The box must contain no leaves, sticks, or other trash. Boxes in the second, third, or fourth layer of the crate must be as well filled as those in the top layer.

Some sections cling to the practice of "facing" or placing the berries in the top layer on their sides, all pointed one way (fig. 7), or placing them with the stem of the berry down, in order to add to the attractiveness of the package. This makes an attractive package of fruit, and there seems to be no harm in the practice until the tendency to "top," or to put the best berries on the face of the box

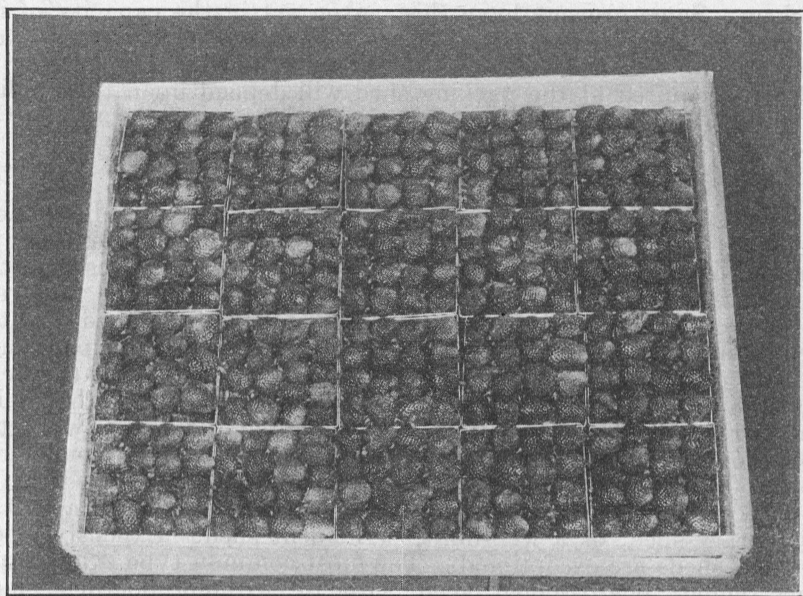


FIG. 7.—A 20-pint crate of California strawberries. The berries have been "faced" in packing

creeps in. Many shipping associations claim that unless strawberries are very high in price, the extra labor cost of "facing" the boxes of berries is not warranted. "Topping" or placing the best berries in the top layer of the box and the poorer or smaller berries in the bottom of the box should not be practiced. The face of a box of berries should be a fair sample of the entire contents of the box, and the contents of the top boxes in a crate should represent fairly the entire contents of the crate.

Strawberries should be graded, packed, hauled to the station, and placed under refrigeration as soon as possible after picking. Vehicles for hauling the berries to the railroad station should be equipped with springs, and should be provided with a canvas, tarpaulin, or other form of cover to protect the berries from the rain, sun, and dust.

## PACKING SHEDS

## MANAGEMENT

Careful supervision at the packing shed by the grower, a member of his family, or a reliable employee, is of vital importance if a satisfactory grade and pack is to be secured. It is especially necessary if the field supervision is incompetent or if the berries are to be graded or classed at the packing shed.

Work at the packing shed includes receipting for the berries delivered by the pickers, grading or classifying, packing, placing boxes in the crate, marking, and nailing on the covers. When the acreage is small, all of this work may be performed by the grower or some member of his family, but when the acreage is large, frequently one person's time is occupied in receipting for fruit delivered by the pickers. Some growers have this person act in the capacity of inspector to note the quality of the berries delivered by each picker, and to note whether the boxes are properly filled. The number of laborers required at the packing shed will depend upon the quality of the berries, the thoroughness of the grading, and the number of pickers in the field.

## LOCATION AND PLAN

The location of the packing shed with reference to the berry field is important. If it is properly placed, only a minimum amount of walking is necessary for the pickers to deliver their berries, and the temptation to walk across the rows to reach the shed is removed. A location at the ends of the rows near the center of the edge of the field is satisfactory for a small field. For larger fields, a path may be laid off at right angles to the rows near the middle of the field, and the packing shed located at one end of, or on, this path. With this arrangement the pickers can be required to walk between the rows to the central path to reach the shed. A location convenient to the farm road is desirable.

Packing-shed facilities vary from the shade of a tree to a tent, a temporary shed, or a well-built, permanent shed. Expensive, permanent sheds are exceptional. The most common type is a cheaply constructed, board-roofed shed with or without boarded sides. There are many reasons for the predominance of the cheap shed. Strawberry fields normally are not profitable for many years in succession, and the largest number are not profitable after the second or third year. It has been a common practice in some berry sections to use only newly cleared land each time a new plantation is set. For these reasons it is necessary to change the location of the sheds frequently. Some growers prefer to have two or three conveniently located temporary packing sheds rather than one permanent shed, which can not always be located so conveniently. As the season is short the sheds are used but a short time. Some growers prefer to erect a temporary structure just before the harvest begins and take it down at the end of the strawberry-picking season. A temporary shed is best adapted to the usual conditions. Where the soils are more fertile, however, and the fields in which the strawberry crop is used as a part of the rotation are closely grouped, a permanent packing shed is advisable.



The convenience of the packing shed depends largely upon the plan from which it is built. The plan shown in Figure 8 is good. The cheaply constructed shed shown in Figure 9 approximates this plan. All pickers are required to enter one end of the passageway shown at the front of the shed. An inspector who receipts for the boxes of berries delivered by the pickers stands at the entrance of this passageway. The pickers place the filled boxes on the receiving table and walk through to the other end of the passageway, where they obtain a supply of empty boxes. The back portion of the receiving table

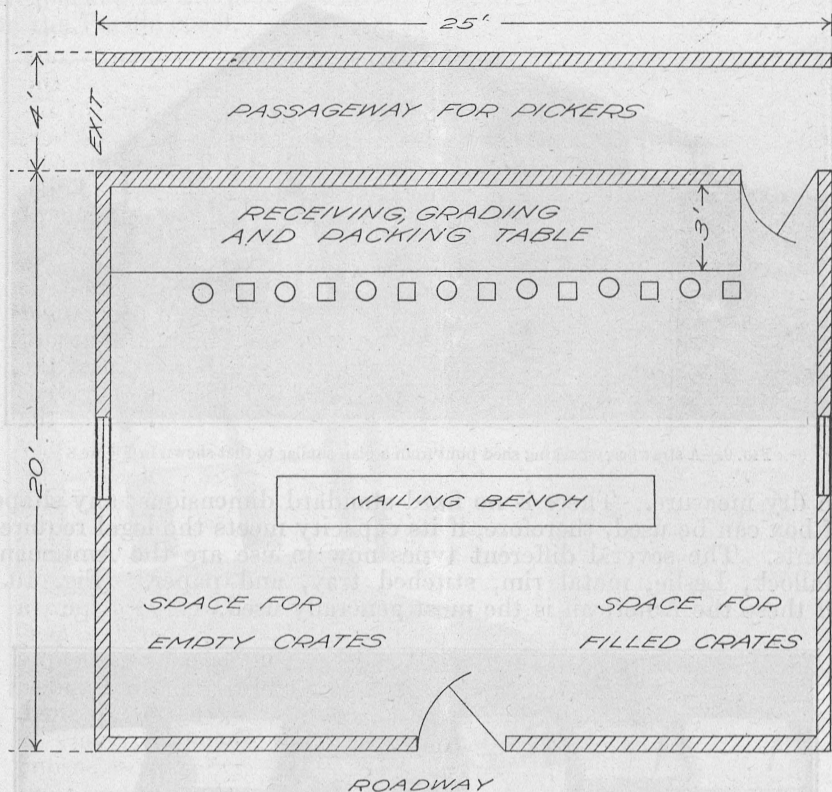


FIG. 8.—A simple yet satisfactory plan for a strawberry-packing shed

is used as the grading and packing table. Benches, upon which empty crates are placed for filling, are at a convenient distance from the packing table. Back of the packing table a solidly built bench is provided upon which the filled crates are placed for nailing. Plenty of space is needed to stack the filled crates so that they will not be exposed to the sun, and to keep a supply of empty crates. In the more expensive sheds storage space for empty crates is provided in the second story. There should be a free circulation of air in the packing shed for the comfort of the packers and for the ventilation of filled crates.

## CONTAINERS

The small containers in which strawberries are marketed are known as boxes, baskets, cups, or tills. In this bulletin they are termed "boxes." Through the United States standard container act<sup>3</sup> three legal sizes for interstate shipment have been established for these boxes. The legal sizes are the quart, pint, and one-half pint based

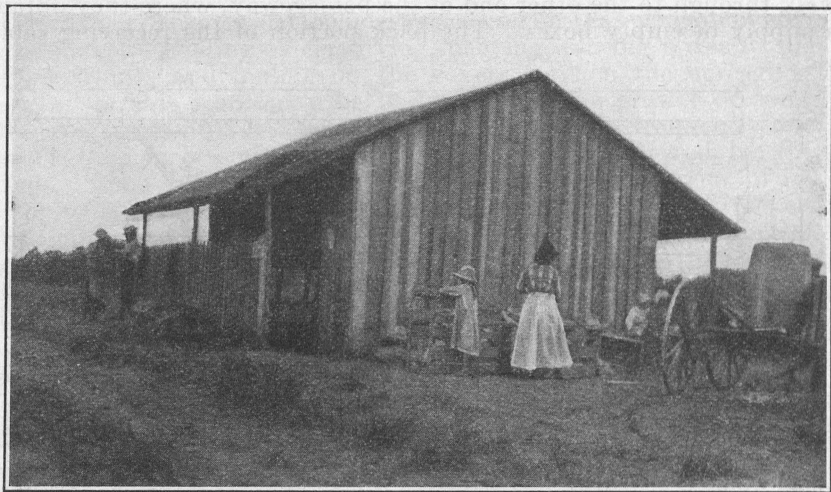


FIG. 9.—A strawberry-packing shed built from a plan similar to that shown in Figure 8

on dry measure. There is no fixed standard dimensions; any shape of box can be used, therefore, if its capacity meets the legal requirements. The several different types now in use are the American, Hallock, Leslie, metal rim, stitched tray, and paper. (Fig. 10.) Of these the American is the most generally used.

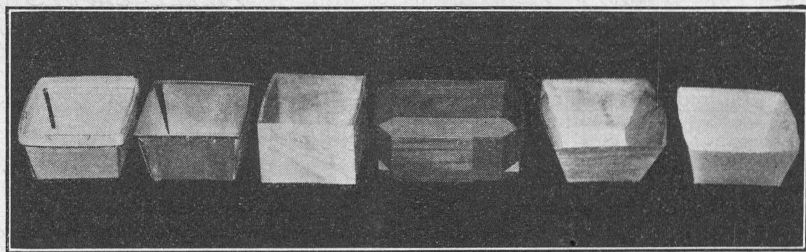


FIG. 10.—From left to right: The American, metal rim, Hallock, Leslie, stitched tray, and paper strawberry boxes

The American is the most popular type east of the Rocky Mountains. The Hallock is generally used in Michigan, southern Indiana, southern Illinois, Oregon, and Washington, but the American is used also to some extent. The use of the Leslie is confined mostly

<sup>3</sup> The following publication, containing the law and the regulations for its enforcement, may be obtained from the Office of Information, United States Department of Agriculture: UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF AGRICULTURAL ECONOMICS. RULES AND REGULATIONS OF THE SECRETARY OF AGRICULTURE UNDER THE UNITED STATES STANDARD CONTAINER ACT OF AUGUST 31, 1916. U. S. Dept. Agr., Bur. Agr. Econ. Serv. and Reg. Announc. 104, 4 p. 1927. (Revised ed.)

to southern Illinois and to parts of Iowa, Nebraska, Kansas, Missouri, and Colorado. The stitched tray in the quart size is used in the districts surrounding St. Louis, and the pint size is used in California. The metal-rim type in the quart size is used in the East and the pint size in California. There are various styles of paper boxes. The American, Hallock, and Leslie shapes in all three of the legal sizes, have been used to some extent in the East. A stitched-tray type, in the pint size, is used in California.

Most of the berries marketed in the eastern half of the country are packed in the pint and quart boxes. Only pint boxes are used on the Pacific coast.

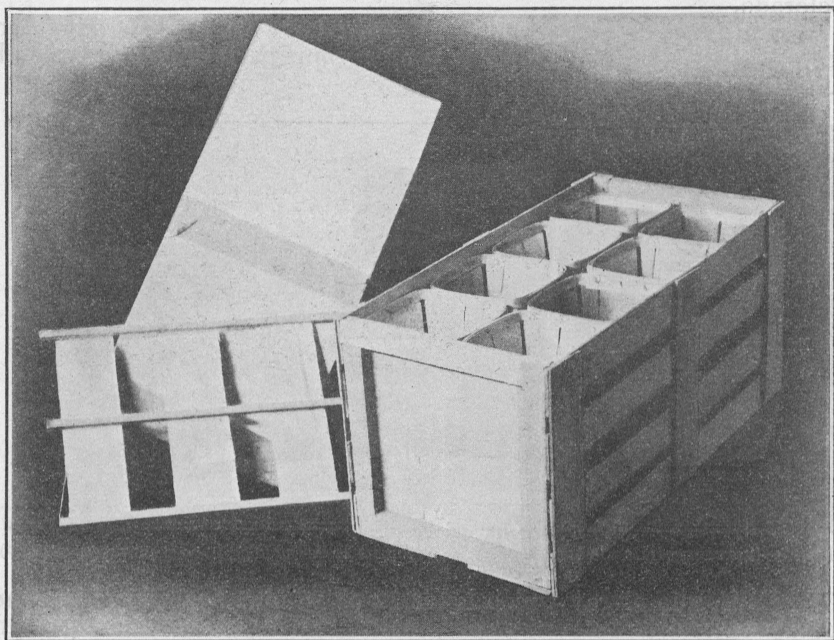


FIG. 11.—The American ventilated crate—a popular and satisfactory type of package for strawberries.

#### SHIPPING PACKAGES

Three types of crates, each constructed to accommodate a different shape of box are most commonly used for shipping strawberries. These are the ventilated or American crate (fig. 11) containing 24 pints, or 24, 32, 48, or 60 quart boxes; the Hallock crate containing 16 or 24 quarts, or 16 or 24 pints; and the Leslie crate containing 24 pints or 24 quarts (fig. 12).

The crates in most general use for strawberries contain 24 or 32 quart boxes. The American crate of the 24-quart size is used in Tennessee, Missouri, Kentucky, Arkansas, and Texas and in the St. Louis districts for the stitched-tray quart boxes. Louisiana uses the 24-pint American crate for early strawberries and the 24-quart crate to some extent for the later fruit. The 32-quart American crate is used in Florida, the Carolinas, Virginia, New York, Maryland, and Delaware. The last two States formerly used a number of 48-quart crates and in the section of Norfolk, Va., the 60-quart crate is

still used to some extent. This type of crate is made in two styles. One has a nailed top and the other has a hinged top which is fastened with a hasp (fig. 13), making inspection less difficult. The latter style is used chiefly in the Atlantic Coast States. The metal-rim quart boxes, as well as the American boxes, are used in all the quart crates mentioned above.

The Hallock crates, containing 16 or 24 quarts, or 16 or 24 pints, are used in Michigan, Illinois, and Indiana. In Oregon and Washington those holding 24 pints are used.

The Leslie crate holds either 24-pint or 24-quart boxes and is used in southern Illinois, parts of Iowa, Nebraska, Kansas, Missouri, and Colorado.

Several types of folding ventilated crates have been used to a greater or less extent. One is now being used in some parts of Tennessee and Arkansas. (Fig. 14.)

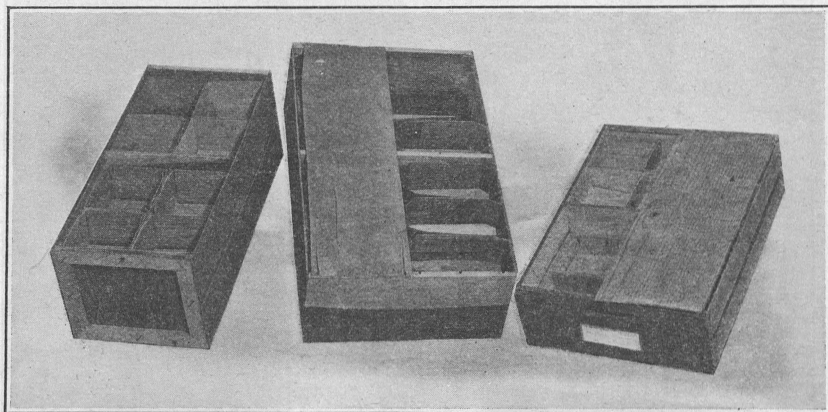


FIG. 12.—Strawberry crates: 16-quart Hallock (left); 24-quart Leslie (middle); 24-deep-pint Hallock (right)

In California a tray which holds 12 or 15 pint boxes of either the metal-rim or stitched-tray type is used. To some extent an old and unique form of chest which holds 16 or 20 trays (fig. 15) is used also; each tray holds 6 pints. The California chest is a returnable package and is gradually going out of favor.

Clean, neat, properly nailed crates constructed of material strong enough to insure the safe delivery of the fruit to the market are best. Soiled or secondhand crates injure the sale of the berries, as the difference in appearance on the market between a new, clean package and a soiled or secondhand package ordinarily will make a sufficient difference in price to compensate for any saving in cost from using the soiled package.

Pony refrigerators (fig. 16) are used extensively in Florida for early express shipments to northern markets. They are heavy cases holding from 64 to 80 quart boxes. The layers of boxes are separated by dividers of the type used in the ordinary crates. Metal trays are built through the center or in the top, or both, to hold a supply of ice. Air-tight covers are clamped on after the berries and ice are in place.

These pony refrigerators are well adapted to long-distance express shipments when it is not possible to load in car lots and when prices



are high. An occasional objection is made that the ice pans sweat and allow water to drop on the berries, causing injury. These refrigerators are not gift packages and must be returned to the owner after being emptied.

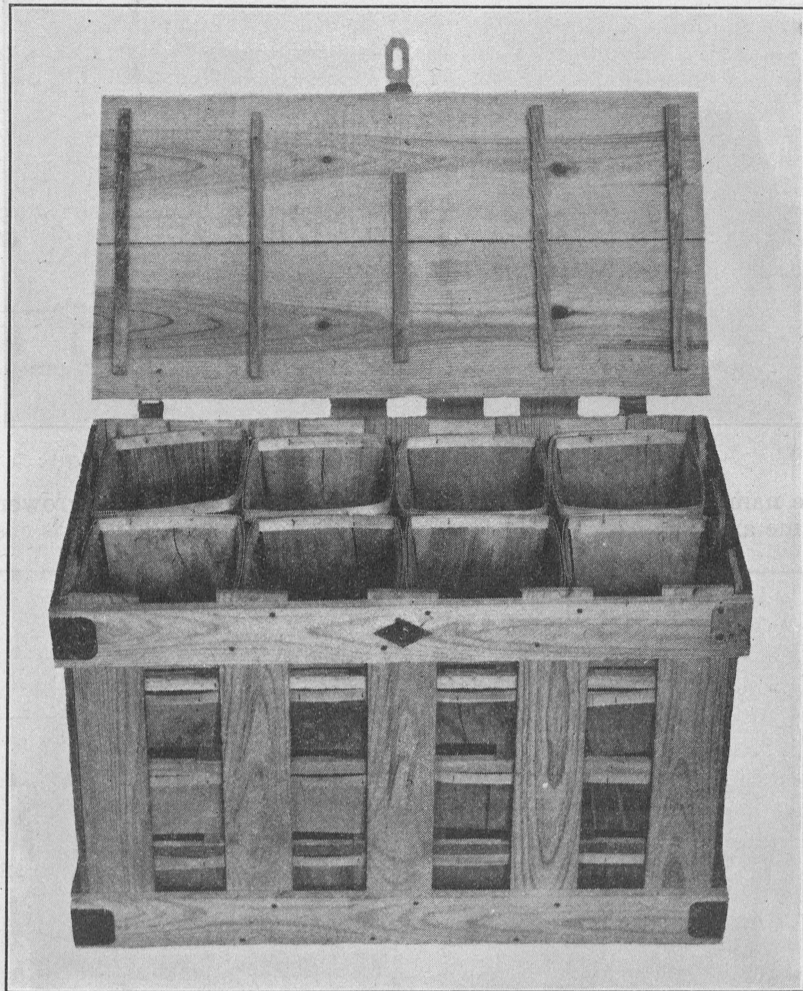


FIG. 13.—American strawberry crate of the hinged-top type

#### BRANDING AND MARKING

Many strawberry-shipping associations use brand labels which are pasted on the ends of the crates. (Fig. 17.) This is good practice for an association which wishes to build a reputation for its berries. The labels need not be expensive. To comply with the net-weight amendment of the Federal food and drugs act, a statement of the quantity of its contents must be marked plainly on the outside of each crate. This statement of contents must be in terms of the largest unit contained in the package—pints or quarts. The usual statement is similar to the following: "This crate contains 24 dry

quarts," or "Contents 24 dry pints." In addition to this mark, the shipping associations usually require that the crate be stamped with

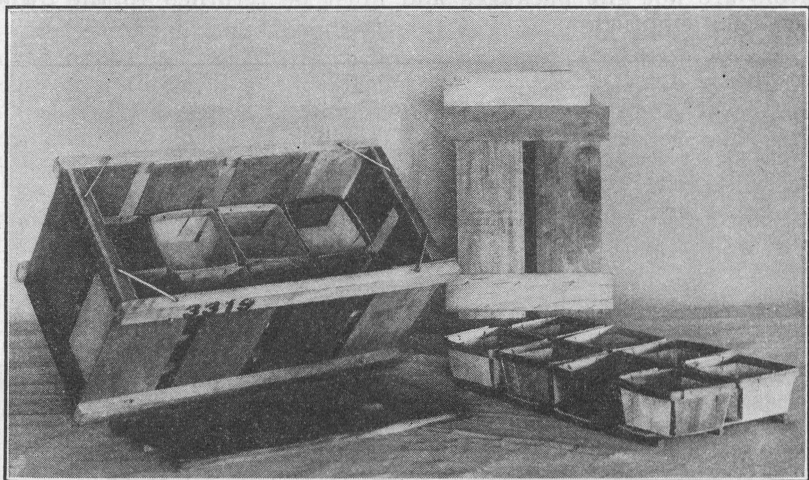


FIG. 14.—A type of folding ventilated strawberry crate

the name of the variety of the berries, the grade, and the grower's name and address. When berries are marked in this way, it is easy

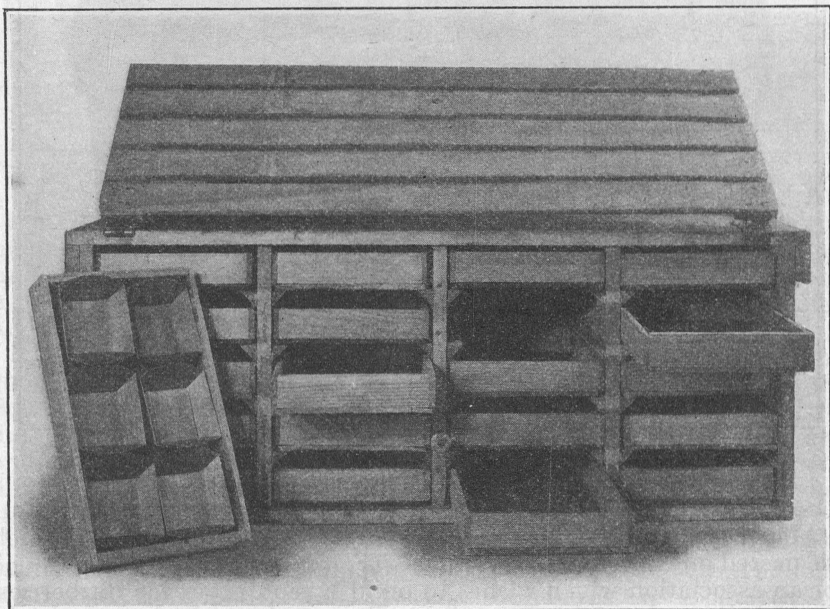


FIG. 15.—The California chest, used for shipping berries a short distance to San Francisco. It is returned to the shipper

to trace complaints of carelessness, or fraudulent packing, back to the grower who is responsible. It adds to the appearance of the

package if the markings are arranged neatly in the upper left-hand corner of one end of the crate. Marks made with rubber stamps or stencils are more attractive than pencil, crayon, or similar markings.

### INSPECTION AND LOADING SHEDS

An important factor which affects the success of a shipping association is a rigid system of inspection at the loading point. (Fig. 18.) It is essential in building up a strong marketing organization because without it no association can be sure of shipping a dependable, standardized product. An efficient organization will have its own staff of inspectors who are responsible to some individual who has in turn been made responsible for the grading and packing for the organization. Association inspectors obtain the best results by spending part of their time among the pickers, packers, and growers, showing them just what is required in putting up a good grade of fruit and how improvements can be made.

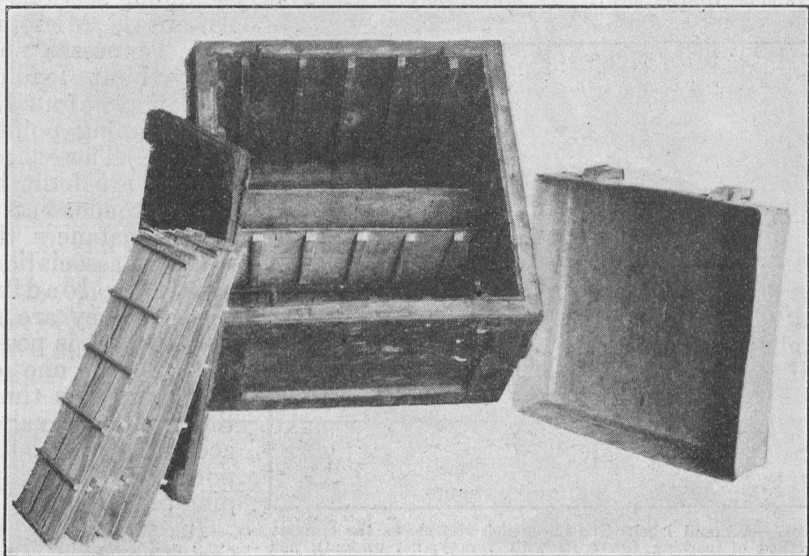


FIG. 16.—Pony refrigerator used extensively by Florida strawberry shippers

Raising the standard of strawberry grading and packing methods in a given community must be regarded as an educational process. Perfection can not be attained at once. Many details present themselves during the season which will call for patience on the part of the growers, the inspectors, and those responsible for the pack. If the work of grading and packing is to bring financial returns, growers must cooperate in packing grades of strawberries which the trade will recognize as always uniform and dependable. Any inspection system is fundamentally wrong which does not make it possible for the grower with well-packed high-grade berries to secure more for his stock than another who delivers inferior, poorly graded stock. Proper discrimination by shipping associations encourages better grading and packing.

Ineffective efforts toward cooperation frequently result in the presence of two or more associations at a shipping station. In such



instances, when the inspection begins to be really effective in one association, some of its grower members are not willing to pack their fruit according to the established grades, and so deliver their berries to another association which has a less effective inspection service. Such growers fail to realize that they are members of an association formed for their mutual benefit and that the management should have their constant support.

The main factors considered by inspectors are size, degree of ripeness, cleanliness, and the proper filling of the crates. The degree of ripeness at which strawberries are accepted for shipment in carload lots depends upon the period of the shipping season and the weather which prevails at picking time. During cool, dry weather, berries may be accepted in riper condition than during hot damp weather.

Adequate loading sheds are of much benefit in almost any shipping section, both to growers and to shippers, besides providing a place for effective inspection. In some of the strawberry-shipping sections of

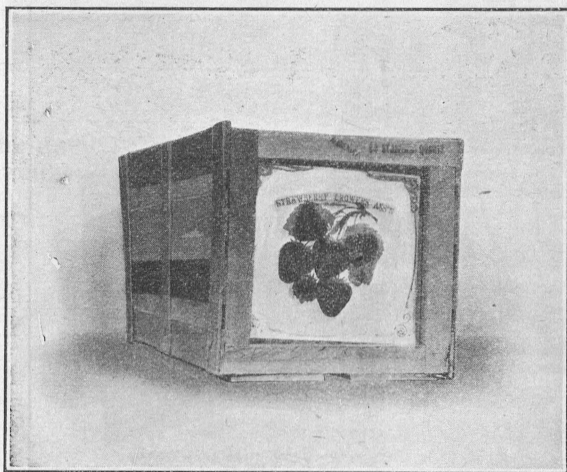


FIG. 17.—A brand label. The illustration also shows the ordinary method of marking the crate with variety, net contents, and grower's name and address.

are inspected at the loading shed before they are placed in the car. The sheds are equipped with benches or tables upon which the filled berry crates are unloaded for the convenience of the inspector. At one point a double row of tables is provided. After the crates are inspected and marked, they are shifted to the second or back table; here the covers are replaced and the crates are loaded in the cars. Careful fastening or nailing of the covers after inspection is necessary so that the crates will carry well and present an attractive appearance on the market.

Usually the grades, as classified by the inspector, are marked on the crates or are indicated by a brand label pasted on the end of the crate. The different grades or brands are then loaded separately in the car or are loaded in different cars, and the grower is given a receipt which shows the number of crates of each grade he has delivered. A duplicate receipt is retained by the association. Careful marking

Arkansas, Missouri, and Tennessee specially built loading sheds may be found at the shipping points. (Fig. 19.) These sheds usually are built by the railroads, but in a few instances the shipping associations own their loading sheds. They are so built that it is possible to load one or more cars at a time; the number varies according to the importance of the shipping point.

In parts of the Ozark section each grower's strawberries



and separating tend to inspire confidence in grades or brands and to facilitate handling and marketing. Where no loading shed is available the inspections are made on the truck or wagon or at the car door.

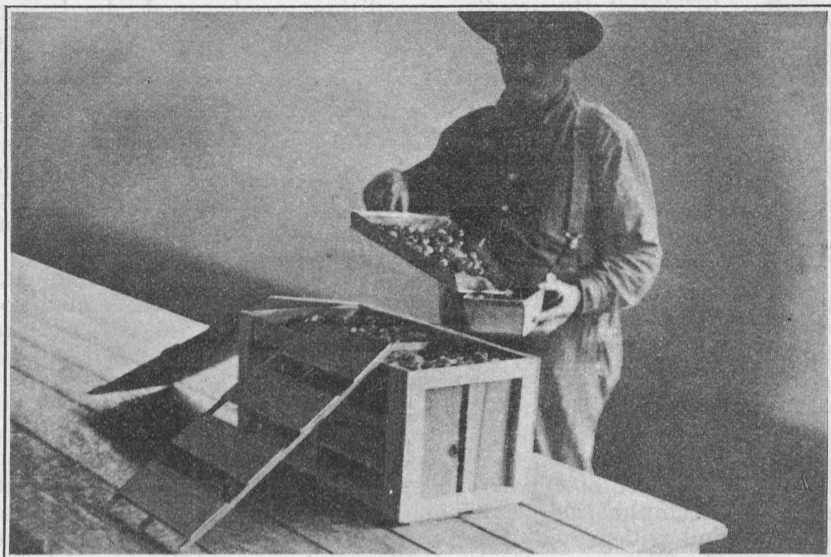


FIG. 18.—Inspecting the strawberries as delivered to the loading shed or platform

The inspection practiced by some associations is very thorough and of great value in keeping up the standard of their pack. Others have allowed the inspection to degenerate into a mere form without value. Thorough inspection serves to eliminate deception and dis-

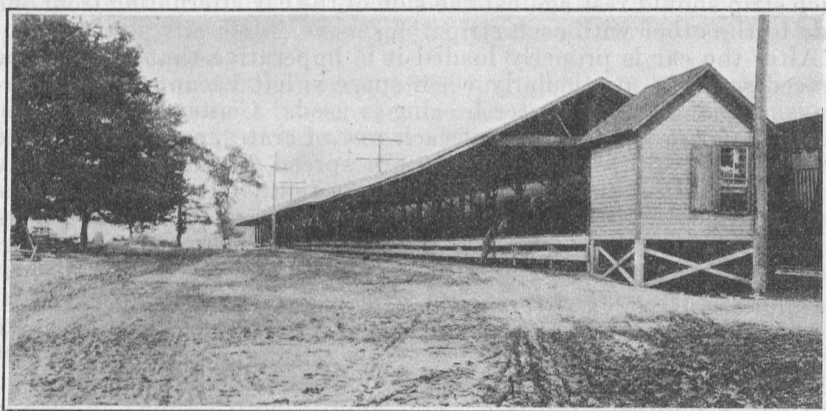


FIG. 19.—A strawberry loading and inspection shed

honest packing; it serves to encourage the production of high-quality fruit and to reduce waste by preventing the shipment of inferior fruit.

A Federal-State shipping-point inspection service is now available in most of the strawberry-shipping sections. This work is usually

under a cooperative arrangement between Federal and State authorities. Upon request of the grower, shipper, receiver, or any other person who has a financial interest in any lot of fruit an inspection is made of the contents of a car and a certificate is issued which describes in detail the quality, condition, grade, pack, load, and other important factors. This certificate is receivable as *prima facie* evidence in any United States court; it is generally accepted as a basis of buying and selling, and is used as a basis of settlement for allowances or rejections, and in connection with insurance and the settlement of claims. The service is entirely optional and the cost is nominal as it is only enough to cover the expense involved. The inspectors who operate in this service are not financially interested in the product they inspect. They are under Federal supervision and are responsible only to their supervisors.

The inspectors usually work on the loading platform or in the car while it is being loaded. Usually a casual examination is made of every crate in each lot of strawberries delivered to the car, to note the uniformity of the lot, and a thorough examination is made of representative samples of each lot.

#### LOADING CARS

The importance of efficient car-loading and bracing methods can not be overemphasized. The loading must be so planned as to be compact and still provide for proper circulation of cold air between the crates.<sup>4</sup> The crates are loaded in stacks across the car with the long side parallel to the side of the car, sufficient space being left between the rows to allow for air circulation.

To prevent side swaying and shifting, each layer in the stack must be securely stripped crosswise of the car with 8-foot strips about 1 inch thick; two strips should be nailed to each layer, one to the front end and one to the back end of each crate. One end of each strip should rest against the side of the car alternating from one side to the other with each strip.

After the car is properly loaded it is imperative that the load be braced securely, particularly when space is left vacant at the doorways. In such cases center bracing is used. Center-bracing gates, made with uprights in front of each row of crates, and two or three crossbars at appropriate heights, are spread or wedged apart by cross braces until the entire load is made tight. These cross braces are cut somewhat longer than the distance between the upright gates or frames and are driven into place and nailed. An examination of cars at market terminals shows that considerable damage in transit is incurred through inadequate or carelessly installed bracing. Inadequate bracing is usually due to the wish to save expense by using a small amount of lumber but this often proves to be poor economy.

Table 1 indicates the range and approximate number of strawberry crates usually loaded in a car.

<sup>4</sup> RIDLEY, V. W. FACTORS IN TRANSPORTATION OF STRAWBERRIES FROM THE OZARK REGION. U. S. Dept. Agr., Bur. Markets Doc. 8, 10 p., illus. 1918.

TABLE 1.—*The range and approximate number of strawberry crates usually loaded in a car.*

State	Containers	Range of number of packages per car	Approximate number of packages usually loaded per car
Kansas, Louisiana, Oregon, Texas, Utah, Washington	24-pint crates	650-800	720
Wisconsin	16-quart crates	600-800	720
Michigan	do.	500-800	650
Alabama, Arkansas, Florida, Illinois, Kentucky, Louisiana, Mississippi, Missouri, Tennessee, Texas	24-quart crates		1 420 2 448
Delaware, Maryland, New Jersey, New York, Virginia	32-quart crates	175-300	240
North Carolina, South Carolina	do.	200-240	232
Florida	do.	175-196	175
Delaware, Maryland, Virginia	60-quart crates	128-160	
California	Trays (pint boxes)	1, 200-1, 400	1, 200

<sup>1</sup> Freight shipments.<sup>2</sup> Express shipments.

## SHIPMENT BY MOTOR TRUCK

In localities in which conditions are favorable the shipment of strawberries by motor truck is rapidly replacing rail shipment. Truck shipments are limited, to a considerable degree, to regions relatively near the markets, where the greater part of the distance covered is over good roads. Usually rail shipments necessitate loading the fruit at the packing shed, hauling it to the shipping point, unloading at the platform, and placing in the car. On completion of the journey by rail it is usually loaded into trucks and hauled to the markets. Strawberries intended for shipment by truck are usually collected at some central point and are there loaded on trucks which move direct to market, thus avoiding much handling. Because of this direct movement, shipment by truck in many instances consumes less time than is required for rail shipment and when made over reasonably good roads the strawberries arrive at their destination in excellent condition.

Under ordinary conditions trucks should be loaded late in the day and the trip so arranged that they will arrive at their destination about midnight or in the early morning hours. If the journey is made during the night, when air temperatures are lowest, the load will be well cooled en route.

There is no standard method of loading a truck with strawberries. The types and sizes of trucks vary to such a degree that it is a matter for the individual truck owner or driver to know just how to load to carry his shipment safely. Snug, tight loading without injury to the contents of the package is the rule that should be followed. All loads should be protected from dust and moisture by some form of covering.

## SUMMARY

The best of marketing facilities can not overcome the handicap of inefficient picking, grading, and packing methods. The unsatisfactory condition and grade of strawberries often found on the markets indicate a need for more attention to standardization and for better handling methods.

The first step in the preparation of strawberries for market is to engage an adequate supply of competent, dependable labor before the picking season begins.

It is necessary to provide competent supervision for the pickers before they are sent into the berry field.

The proper stage of ripeness for harvesting strawberries as determined by color depends upon the variety and the distance to be

shipped, but it varies from about three-fourths colored to a full-red color. Growers and shippers who trace occasional shipments to market can determine whether the fruit is being delivered to dealers in the best possible condition as to ripeness.

The best picking is done by the use of the thumb and forefinger, each berry being pinched off with a stem about three-eighths to one-half inch long and carefully placed. Berries should not be snatched off and tossed or thrown into the boxes. Many pickers need instructions as to the proper method of picking.

Trays for carrying the berry boxes into the field are best when they are light in weight but substantial, medium in size, and so built that the boxes fit into them snugly.

Exposure to the sun, rain, or dust in the field, at the packing shed, or while being hauled to the loading station will injure the picked strawberries.

Under most conditions the removal of undesirable berries from field-run stock will be as much hand grading as will be found practicable. Avoidance of unnecessary handling is advisable.

Whether or not the berries have been graded, the filled boxes should be classified as to quality before they are placed in crates for shipment.

Depending upon conditions, strawberries may be graded either in the field by the pickers or in the packing shed by special labor. Field grading by pickers reduces handling.

Fixed, uniform strawberry grades are very desirable as a guide and basis for the use of growers in preparing their crop for the market, of buyers in the purchase of fruit, and of inspectors at the point of shipment or destination.

The important factors considered in standardized strawberry grades are size and quality.

Boxes should contain a uniform grade of berries and should be so filled that they are not slack nor yet full enough for the berries to be crushed. It is advisable to place the fruit under refrigeration as soon as possible after it is packed.

Careful supervision at the packing shed is of vital importance; so also is the location and plan of the packing shed.

The crates in most general use for strawberries contain 24 or 32 dry-quart boxes. Crates holding 16, 20, 24, 30, or 32 pint boxes and 16, 48, or 60 quart boxes also are used. New, clean, attractive, strongly made crates are best. The selling price of berries is affected when they are offered for sale in damaged or unattractive packages.

Growers and shipping associations who desire to build a reputation for well-standardized grades of berries sometimes use brand labels pasted on the ends of crates to good advantage. The Federal food and drugs act requires that all crates of berries be marked with a statement of the quantity of the contents. If the variety, the grade, and the grower's name and address are also neatly marked, the prospective buyer will have confidence in the product.

A rigid system of inspection at the loading stations is a prerequisite to the permanent success of shipping associations.

Most of the strawberry-shipping sections would be benefited greatly by adequate sheds for car loading and inspection.

For safe carrying, crates must be loaded in the car compactly, with ample provision for the circulation of cold air, and they must be braced firmly to avoid shifting and damage in transit.